#### What is claimed is:

1. A method of controlling a transducer head velocity during a ramp load/unload comprising the steps of:

measuring the voltages across a Voice Coil Motor ("VCM") and a sense resistor positioned in series with the VCM;

calculating the back emf voltage using the measured VCM and sense resistor voltages; and

adjusting the velocity of the transducer head using the calculated back emf voltage.

- 10 2. The method of claim 1 wherein the VCM and sense resistor voltage measurements are calibrated at power-up.
  - 3. The method of claim 1 wherein the back emf voltage is calculated using a PWM technique.
- 4. The method of claim 1 wherein the back emf voltage is calculated using an IR cancellation technique.
  - 5. The method of claim 1 wherein the back emf voltage is calculated using either a PWM technique or an IR cancellation technique.
  - 6. The method of claim 1 wherein a microprocessor calculates the back emf voltage.
- 7. The method of claim 6 wherein the microprocessor calculates the back emf voltage using a PWM technique.
  - 8. The method of claim 6 wherein the microprocessor calculates the back emf voltage using an IR cancellation technique.

- 9. The method of claim 6 wherein the microprocessor calculates the back emf voltage using either a PWM technique or an IR cancellation technique.
- 10. The method of claim 6 wherein the microprocessor sends a signal to
  a control circuit to adjust the velocity of the transducer heads.
  - 11. The method of claim 10 wherein the signal is sent real-time to the control circuit.
  - 12. The method of claim 1 further comprising the step of measuring a reference voltage through separate reference voltage paths.
- 13. The method of claim 12 further comprising the step of applying a current to the VCM to start/stop the movement of the transducer head.
  - 14. The method of claim 12 further comprising the step of:
    using the value for the voltages across the VCM and the sense
    resistor to calculate a calibration constant.
- 15 15. The method of claim 14 wherein calculating the calibration constant further comprises the steps of:

comparing\_the voltage measured on a first reference voltage path with the voltage measured across the VCM; and

comparing the voltage measured on a second reference voltage path 20 with the voltage measured across the sense resistor.

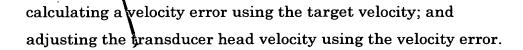
16. Amethod of controlling a transducer head velocity during a ramp load/unload comprising the steps of:

setting a target velocity;

measuring the voltages across a voice coil motor ("VCM") and a sense resistor in series with it;

calculating a back EMF voltage using the measured voltages across the VCM and the sense resistor;

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17. The method of claim 16 wherein calculating the velocity error further comprises the steps of:

calculating the velocity of the transducer head using the measured back emf voltage; and

comparing the velocity of the transducer head and the target velocity.



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- 18. The method of claim 16 further comprising the step of: employing the Proportional-Integral control technique.
- 19. The method of claim 18 wherein the velocity of the transducer head is calculated in discrete-time.

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- The method of claim 16 further comprising the step of: sending a signal to a driver circuit that controls the velocity of the transducer heads.
- 21. The method of claim 20 wherein the step of sending a signal to a driver circuit further comprises:

calculating a control variable using the velocity error; and sending the value of the control variable to a driver circuit.

- 20 22. The method of claim 21 wherein the velocity error is calculated in discrete-time.
  - 23. The method of claim 22 further comprising:
    setting the velocity error variable for a previous sampling period
    equal to the voltage error variable for the current sampling period.

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- 24. The method of claim 23 further comprising:
  setting the control variable for a previous sampling period equal to
  the control variable for a current sampling period.
- 25. The method of claim 16 further comprising the step of: disabling the VCM at the completion of the load/unload.
- 26. The method of claim 25 further comprising the step of: stopping the control of the transducer head at the completion of the ramp load/unload.
- 27. A method of measuring a transducer head velocity during a ramp10 load/unload comprising the steps of:

measuring the voltages across a voice coil motor ("VCM") and a sense resistor in series with the VCM;

calculating the back EMF voltage using the measured voltages across the VCM and the sense resistor; and calculating the velocity error using the back EMF voltage.

- 28. The method of claim 26 wherein the velocity of the transducer head is calculated in discrete-time.
- 29. The method of claim 27 further comprising:
  using a velocity from a previous sampling period to determine a
  velocity for the current sampling period.
- 30. The method of claim 27 further comprising the step of:
  measuring a reference voltage through separate reference voltage
  paths.
- 31. The method of claim 30 further comprising the step of:
  using the value for the voltages across the VCM and the sense resistor to calculate a calibration constant.

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32. The method of claim 31 wherein calculating the calibration constant further comprises the steps of:

comparing the voltage measured on a first reference voltage path with the voltage measured across the VCM; and

comparing the voltage measured on a second reference voltage path with the voltage measured across the sense resistor.

## 33. A disk drive comprising:

an actuator assembly having a voice coil motor that has an internal resistance;

a driver circuit for connecting and driving the actuator assembly;

a sense resistor in series with the voice coil motor whereby back emf voltage is determined by measuring the voltages across the VCM and sense resistor.

## 34. The disk drive of claim 33 further comprising:

a microprocessor for connecting to and sending an input signal to the driver circuit.

### 35. The disk drive of claim 33 wherein:

the microprocessor calculates the velocity of the voice coil motor and sends a signal based on the velocity to the driver circuit.

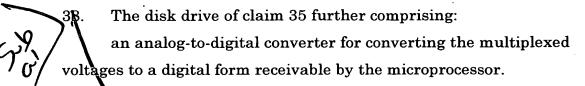
#### 20 36. The disk drive of claim 33 further comprising:

a first operational amplifier for magnifying the voltage across the VCM resistance; and

a second operational amplifier for magnifying the voltage across the sense resistor.

# 25 37. The disk drive of claim 33 further comprising:

a multiplexer for multiplexing the outputs of the operational amplifiers.



- 39. The disk drive of claim 38 wherein the analog-to-digital converter uses 12-bits.
  - 40. The disk drive of claim 38 wherein the analog-to-digital converter has a full-scale voltage of 5 Volts.
  - 41. The disk drive of claim 38 wherein the analog-to-digital converter has a resolution on the order of 1 mV/count.
- 10 42. The disk drive of claim 33 wherein the back emf voltage may be calculated using either a PWM technique or an IR cancellation technique.

